biochemical systematics and ecology

INDEX Volume 19 1991

Pergamon Press
OXFORD · NEW YORK · SEOUL · TOKYO

biochemical systematics and ecology

Executive Editors

P. M. Richardson
Missouri Botanical Garden, P.O. Box 229, St Louis, MO 63166-0299, U.S.A.
E. Schoffeniels
Laboratoire de Biochimie, Université de Liège, place Delcour 17, 4020 Liège, Belgium
P. G. Waterman
Phytochemistry Research Laboratories, Department of Pharmacy, University of Strathclyde, 204 George Street, Glasgow G1 1XW, U.K.

Founding Editor

T. Swain ✠

Editorial Board

E. S. Albone, *Clifton College/University of Bristol, The Science School, Bristol BS8 3JH, U.K.*
A. Burny, *ULB (Université Libre de Bruxelles), Dept de Biologie Moleculaire, 67 rue des Chevaux, 1640 Rhode St. Genese, Bruxelles, Belgium*
H. J. Ceccaldi, *Laboratoire de Biochimie et Ecologie des Invertébres marins, Station marine d'Endoume, rue de la Batterie des Lions, 13007 Marseille, France*
G. Cooper-Driver, *Department of Biological Services, Boston University, 2 Cummington Street, Boston, MA 02215, U.S.A.*
K. Dettner, *Lehrstuhl für Tierökologie II, Universität Bayreuth, Postfach 101251, NW1 D-8580 Bayreuth, F.R.G.*
J. J. Doyle, *L. H. Bailey Hortorium, 467 Mann Library, Cornell University, Ithaca, NY 14853, U.S.A.*
J. B. Harborne, *Department of Botany, The University, Whiteknights, P.O. Box 221, Reading RG6 2AS, U.K.*
R. K. Jansen, *Department of Ecology and Evolutionary Biology, University of Connecticut, Box U-43, Storrs, CT 06268, U.S.A.*
J. H. Langenheim, *University of California, Santa Cruz, Department of Biology, Santa Cruz, CA 95064, U.S.A.*
D. E. Lincoln, *Department of Biological Sciences, University of South Carolina, 700 Sumter Street, Columbia, SC 29208, U.S.A.*
R. L. Lindroth, *Department of Entomology, 237 Russell Laboratories, 1630 Linden Drive, Madison, WI 53706, U.S.A.*
G. Lucotte, *Laboratoire d'Enzymologie du C.N.T.S., 9 Rue Alexandre-Cabanel, 75739 Paris, Cedex 15, France*
N. Matsuoka, *Department of Biology, Faculty of Science, Hirosaki University, 3 Bunkyo-cho, Hirosaki 036, Japan*
S. Mole, *University of Nebraska Lincoln, School of Biological Sciences, 348 Manter Hall, Lincoln, NE 68588-0118, U.S.A.*
J. Ninio, *Institut Jacques Monod, Tour 43, 2 Place Jussieu, 75251 Paris, Cedex 05, France*
R. T. Nishimoto, *Hawaii Department of Land and Natural Resources, Division of Aquatic Resources, 75 Aupuni Street, Hilo, HI 96720, U.S.A.*
J. M. Pasteels, *ULB, Faculté des Sciences, Biologie Animale et Cellulaire, av. FD Roosevelt 50, 1050 Bruxelles, Belgium*
D. S. Seigler, *Department of Plant Biology, University of Illinois, Urbana, Il 61801, U.S.A.*
M. S. J. Simmonds, *Royal Botanic Gardens Kew, Richmond, Surrey, TW9 3AB, U.K.*
P. Steinberg, *School of Biological Sciences, University of New South Wales, P.O. Box 1, Kensington, NSW 2033, Australia*
B. L. Turner, *Department of Botany, The University of Texas at Austin, TX 78712, U.S.A.*

Production Editor

Jenny Howatson

Journals Production, Pergamon Press plc, Headington Hill Hall, Oxford OX3 0BW, U.K.

Annual Subscription Rates (1992)

Annual Institutional Subscription Rate (1992): £280.00 (U.S.$450.00). Two-year Institutional Rate (1992/93): £532.00 (U.S.$855.00). Sterling prices are definitive. U.S. dollar prices are quoted for convenience only, and are subject to exchange rate fluctuation. Personal subscription rate for those whose library subscribes at the regular rate is available on request from any Pergamon office. Prices include postage and insurance and are subject to change without notice.
Subscription enquiries from customers in North America should be sent to: Pergamon Press Inc., 395 Saw Mill River Road, Elmsford, NY 10523, U.S.A., and for the remainder of the world to: Pergamon Press plc, Headington Hill Hall, Oxford, OX3 0BW, U.K.
Subscription rates for Japan are available on request.
Back Issues
Back issues of all previously published volumes, in both hard copy and on microform, are available direct from Pergamon offices.

8 issues make 1 volume.

Whilst every effort is made by the Publishers and Editorial Board to see that no inaccurate or misleading data, opinion or statement appear in this journal, they wish to make it clear that the data and opinions appearing in the articles and advertisements herein are the sole responsibility of the contributor or advertiser concerned. Accordingly, the Publishers, the Editorial Board and Editors and their respective employees, officers and agents accept no responsibility or liability whatsoever for the consequences of any such inaccurate or misleading data, opinion or statement.

Publishing, Subscription and Advertising Offices

Headington Hill Hall, Oxford OX3 0BW, U.K.
395 Saw Mill River Road, Elmsford, NY 10523, U.S.A.

Copyright © 1992, Pergamon Press plc.
It is a condition of publication that manuscripts submitted to this journal have not been published and will not be simultaneously submitted or published elsewhere. By submitting a manuscript, the authors agree that the copyright for their article is transferred to the Publisher, if and when the article is accepted for publication. However, assignment of copyright is not required from authors who work for organizations which do not permit such assignment. The copyright covers the exclusive rights to reproduce and distribute the article, including reprints, photographic reproductions, microform or any other reproductions of similar nature and translations. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, electrostatic, magnetic tape, mechanical photocopying, recording or otherwise, without permission in writing from the copyright holder.

PHOTOCOPYING INFORMATION FOR USERS IN THE U.S.A.
The Item-Fee Code for this publication indicates that authorization to photocopy items for internal or personal use is granted by the copyright holder for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service provided the stated fee for copying, beyond that permitted by Section 107 or 108 of the United States Copyright Law, is paid. The appropriate remittance of $3.00 per copy per article is paid directly to the Copyright Clearance Center Inc., 27 Congress Street, Salem, MA 01970.
Permission for other use. The copyright owner's consent does not extend to copying for general distribution, for promotion, for creating new works, or for resale. Specific written permission must be obtained from the Publisher for such copying.

♾™ The text paper used in this publication meets the minimum requirements of American National Standard for Information Sciences—Permanence of Paper for Printed Library Materials, ANSI Z39. 48-1984.

The Item-Fee Code for this publication is: 0305-1978/91 $3.00 +0.00.

contents

number 1

Notes to Contributors 1

ANIMAL ECOLOGY

Ecological Implications of Cultured Mussel Biodeposition for a Short Food Web Under Winter Conditions in the Mediterranean Sea
M. Vincent, C. Grenz & C. Salen-Picard 5

ANIMAL SYSTEMATICS

Biochemical Variability in Four Species of Strigiformes
E. Randi, R. Lorenzini & G. Fusco 13

Sterol Composition and Classification of the Porifera
P. R. Bergquist, P. Karuso, R. C. Cambie & D. J. Smith 17

Species-specific Secretions of the Dufour Glands of Three Species of Formicine Ants (Hymenoptera: Formicidae)
A.-G. Bagnères, E. D. Morgan & J.-L. Clement 25

Intra- and Interspecific Variations in the Defence Secretions of the Malaysian Termite *Hospitalitermes* (Isoptera: Nasutitermitinae)
C. H. Chuah, S. H. Goh & J. W. Blunt 35

PLANT SYSTEMATICS

Isoelectric Focusing Analysis of RUBISCO in *Lepidium* (Brassicaceae), sections *Lepia, Lepiocardamon* and *Cardamon*
K. Mummenhoff & H. Hurka 47

Hybridization in the Genus *Baccharis*: *Baccharis linearis* × *B. macraei*
F. Faini, F. Hellwig, C. Labbé & M. Castillo 53

The Sesquiterpene Lactone Chemistry of *Helianthus* Sect. *Atrorubentes* (Asteraceae: Heliantheae)
O. Spring & E. E. Schilling 59

Leaf Flavonoid Aglycone Patterns and Sectional Classification in the Genus *Vicia* (Leguminosae)
M. E. Webb & J. B. Harborne 81

The Flavonoids of *Oenothera* Sect. *Megapterium* (Onagraceae)
J. E. Averett, W. L. Wagner & S. Huang 87

NEW SOURCE REPORT

8-Prenylcoumarins: Typical Secondary Metabolites of the Rutaceae from *Pentaceras australis*
A. Quader, A. I. Gray, T. G. Hartley & P. G. Waterman 91

Book Reviews 93

Erratum 95

Addendum 95

number 2

ECOLOGY

Genetic Variation in Response of the Gypsy Moth to Aspen Phenolic Glycosides
R. L. Lindroth & A. V. Weisbrod 97
Changes in Body Constituents of Young Red Sea Bream, *Pagrus major*, in Reference to Survival during Experimental Stocking
H. Nakagawa, H. Imabayashi, H. Kurokura & S. Kasahara 105
Selective Herbivory of Ponderosa Pine by Abert Squirrels: A Re-examination of the Role of Terpenes
X. Zhang & J. S. States 111

SYSTEMATICS

Phylogenetic Relationships within the Order Hadromerida (Porifera, Demospongiae, Tetractinomorpha) as Indicated by Ribosomal RNA Sequence Comparisons
M. Kelly-Borges, P. R. Bergquist & P. L. Bergquist 117
Characterization of the Cuticular Lipids of the Larvae and Adults of the Pecan Weevil, *Curculio caryae*
K. E. Espelie & J. A. Payne 127
Gular and Paracloacal Gland Secretions of Crocodilians: A Comparative Analysis by Thin-layer Chromatography
P. J. Weldon & M. J. Tanner 133
Dinoflagellates Cyclize Squalene Oxide to Lanosterol
J.-L. Giner, L. Wünsche, R. A. Andersen & C. Djerassi 143
Geographic Monoterpene Variability of *Pinus albicaulis*
E. Zavarin, Z. Rafii, L. G. Cool & K. Snajberk 147
Flavonoid Analysis of European Species of the Genus *Hypochoeris* (Asteraceae)
J. L. Fiasson, K. Gluchoff-Fiasson, C. Mugnier, N. Barghi & S. Siljak-Yakovlev 157
Chemosystematic Differentiation of *Quercus ilex* and *Q. rotundifolia* Based on Acorn Fatty Acids
Z. A. Rafii, E. Zavarin & Y. Pelleau 163
Iridoids from *Loasa tricolor*
M. Nicoletti, A. Di Fabio, M. Serafini, J. A. Garbarino, M. Piovano & M. C. Chamy 167
Chemosystematics of *Acradenia* and General Significance of Acetophenones in the Rutaceae
A. Quader, J. A. Armstrong, A. I. Gray, T. G. Hartley & P. G. Waterman 171

Book Reviews 177

Notes to Contributors I

number 3

SYSTEMATICS

The Genetics of California Populations of the Blue Mussel: Further Evidence for the Existence of Electrophoretically Distinguishable Species or Subspecies
S. K. Sarver & E. J. Loudenslager 183
Genetic Discrimination of Italian Bee, *Apis mellifera ligustica* Versus Carniolan Bee, *Apis mellifera carnica* by Allozyme Variability Analysis
A. Comparini & A. Biasiolo 189
Biochemical Studies on the Relationship Between Socially Parasitic Ants and Their Hosts
J. Heinze 195
Tissue Distribution and Subcellular Localization of Glutamate Dehydrogenase in a Freshwater Air-breathing Teleost, *Heteropneustes fossilis*
J. R. Das, N. Saha & B. K. Ratha 207
Phylogenetic Relationships and Rates of Allozyme Evolution within the Phasianidae
E. Randi, G. Fusco, R. Lorenzini & T. M. Crowe 213
The Chemical Composition of Species of *Geodia, Isops* and *Stryphnus* (Choristida: Demospongia: Porifera)—A Comparative Study with Some Taxonomical Implications
L. Hougaard, C. Christophersen, P. H. Nielsen, A. Klitgaard & O. Tendal 223
Flavonol Glycosides from Needles of *Pinus banksiana*
M. M. Abou-Zaid & C. Nozzolillo 237
An Appraisal of the Plasticity of Alkane Profiles of Some Species of Velloziaceae
A. Salatino, M. L. F. Salatino, R. De Mello-Silva & I. Duerholt-Oliveira . . 241
Chemosystematic Differentiation of *Quercus ilex* and *Q. rotundifolia* based on Acorn Steroids
Z. A. Rafii, E. Zavarin & Y. Pelleau 249
The Alkaloid Pattern of *Cytisophyllum sessilifolium* (Fabaceae-Genisteae)
R. Greinwald, L. Witte, V. Wray & F.-C. Czygan 253
Book Reviews 259
Notes to Contributors I

number 4

SYSTEMATICS

Opine Oxidoreductases in Brachiopods, Bryozoans, Phoronids and Molluscs
C. S. Hammen & R. C. Bullock 263
Genetic Evaluation of the Taxonomic Status of Two Varieties of the Cosmopolitan Ascidian *Botryllus niger* (Ascidiaceae: Botryllidae)
S. Aron & A. Sole-Cava 271

Phylogenetic Analysis of Species of Three Subgenera of *Coryphaenoides* (Teleostei: Macrouridae) by Peptide Mapping of Homologs of LDH-A_4
R. R. Wilson, Jr, J. F. Siebenaller & B. J. Davis 277
Aaptamine, a Taxonomic Marker for Sponges of the Order Hadromerida
P. R. Bergquist, R. C. Cambie & M. R. Kernan 289
The Defensive Secretion of Omaliinae and Proteininae (Coleoptera: Staphylinidae): Its Chemistry, Biological and Taxonomic Significance
K. Dettner & F. Reissenweber 291
Genetic Relationships in *Arceuthobium monticola* and *A. siskiyouense* (Viscaceae): New Dwarf Mistletoe Species from California and Oregon
D. L. Nickrent & T. L. Butler 305
Studies on *Epimedium* Species: Flavonol Glycosides and Isozymes
S. Koga, Y. Shoyama & I. Nishioka 315
Proanthocyanidins in the Testa of Centrospermous Seeds
V. Bittrich & M. Do Carmo E. Amaral 319
Distribution of Sesquiterpene Lactones and Polyacetylenic Thiophenes in *Echinops*
Berhanu M. Abegaz, Mesfin Tadesse & Runner Majinda 323
Anthocyanins of the Genus *Erythrina* (Fabaceae)
R. Scogin 329
The Significance of the Iridoid Glycoside, Catalpol, in *Scutellaria*
M. D. Cole, A. J. Paton, R. M. Harley & L. E. Fellows 333
Book Reviews 337
Notes to Contributors I

number 5

CHITIN IN BIOGEOCHEMICAL CYCLES

Foreword
E. Schoffeniels 345
Chitin Biomass and Production in the Marine Environment
Ch. Jeuniaux & M. F. Voss-Foucart 347
Chitin Primary Production
R. A. Smucker 357
Chitin Dynamics in the Freshwater Environment
S. Miyamoto, H. Yamamoto & H. Seki 371
Chitin Biodegradation in Sand Dunes
S. Hirano, Y. Koishibara, S. Kitaura, T. Taneko, H. Tsuchida, K. Murae & T. Yamamoto 379
Chitin Biodegradation in Marine Environments: An Experimental Approach
M. Poulicek & Ch. Jeuniaux 385
Mineralization of Chitin in an Estuarine Sediment: The Importance of the Chitosan Pathway
G. W. Gooday, J. I. Prosser, K. Hillman & M. G. Cross 395
Chitin Paleoecology
R. F. Miller 401

SYSTEMATICS

Phylogenetic Relationships of Members of the Genus *Pteronotropis* Inferred from Parsimony Analysis of Allozymic and Morphological Data (Cyprinidae: Cypriniformes)
W. W. Dimmick & R. Lawson 413
Variability of Foliage Terpenes of *Fitzroya cupressoides*
L. G. Cool, A. B. Power & E. Zavarin 421
Constituants Chimiques de Trois Especes de *Burasaia* (Menispermacees) Endemiques de Madagascar
Ph. Rasoanaivo, S. Ratsimamanga-Urverg, A. Rakoto-Ratsimamanga & A. Raharisololalao 433

NEW SOURCE REPORTS

Sesquiterpenoids and Flavonoids of *Achillea* Species
S. Öksüz, S. Gümüş & K. Alpinar 439
Sesquiterpene Lactones from *Episcothamnus candelabrum*
F. Bohlmann & R. M. King 440

Notes to Contributors I

number 6

ECOLOGY

Alkaloidal Glycosidase Inhibitors in Nocturnal and Diurnal Uraniine Moths and their Respective Foodplant Genera, *Endospermum* and *Omphalea*
G. C. Kite, L. E. Fellows, D. C. Lees, D. Kitchen & G. B. Monteith 441
Gum Arabic (*Acacia senegal*) from Niger—Comparison with Other Sources and Potential Agroforestry Development
D. M. W. Anderson, J. R. A. Millar & Wang Weiping 447

SYSTEMATICS

Unique Isozyme Electromorphs in Polygynous Red Imported Fire Ant Populations
R. F. Dunton, S. Bradleigh Vinson & J. Spencer Johnston 453
Genetic Diversity and Differentiation of the Endemic Subterranean Golden Moles of South Africa
M. G. Filippucci, G. C. Hickman, E. Capanna & E. Nevo 461
Genetic Variability in the Subterranean Rodents *Ctenomys australis* and *Ctenomys porteousi* (Rodentia: Octodontidae)
L. I. Apfelbaum, A. I. Massarini, L. E. Daleffe & O. A. Reig 467
Chemotaxonomic Approach to *Diplotaxis muralis* (Cruciferae: Brassiceae) and Related Species
M. D. Sanchez-Yelamo & J. B. Martinez-Laborde 477
The Utility of Leaf Flavonoids as Taxonomic Markers in the Subfamily and Generic Classification of the Velloziaceae
C. A. Williams, J. B. Harborne & N. L. de Menezes 483

Isoflavonoid Phytoalexins from the Fungus-inoculated Leaflets of *Erythrina* Species
J. L. Ingham 497
Chemotaxonomy of Section *Leuce* Poplars by GC-MS of Bud Exudate
W. Greenaway, S. English, J. May & F. R. Whatley 507
A Rapid and Sensitive Method to Detect Cyanogenesis Using Microtiterplates
P. Kakes 519

NEW SOURCE REPORT

Furoheliangolides: Typical Metabolites of *Sclerocarpus sessilifolius*
X. A. Dominguez & C. Zdero 523
Book Reviews 525
Notes to Contributors I

number 7

ECOLOGY

A Comparison of the Effect of Mechanical and Insect Damage on Alkaloid Levels in *Atropa acuminata*
M. B. Khan & J. B. Harborne 529
Potential Pollinator-attracting Chemicals from *Victoria* (Nymphaeaceae)
G. Kite, T. Reynolds & G. T. Prance 535

SYSTEMATICS

Cryptic Variation in Electrophoretically-Detected Allozymes of Caddisfly Larvae (*Hydropsyche simulans, Hydropsyche bifida*) and Spotfin Shiners (*Notropis spilopterus*): Implications for Allele and Genotype Determinations
R. B. Gillespie, C. F. Facemire & S. I. Guttman 541
Genetic and Morphological Variation among Biotypes of *Tephritis bardanae*
S. Eber, P. Sturm & R. Brandl 549
Different Approaches to Analysis of Restriction Fragment Patterns of Chloroplast DNA and Phylogenetic Relationships in *Silene* Section *Siphonomorpha* (Caryophyllaceae)
J. M. Sandbrink & J. van Brederode 559
Seed Protein Patterns of Cucurbitaceae and their Taxonomic Implications
M. K. Pasha & S. P. Sen 569
Individual Variation in the Flavonoid Aglycones Excreted on the Leaves of *Alnus glutinosa*: Influence of Culture Conditions and Origin of Flavonoid Natural Diversity in Wild Specimens
C. Daniere, J. F. Gonnet & A. Moiroud 577
Variation in the Flavonoid Aglycone Mixture Excreted on the Leaves of Black Alder (*Alnus glutinosa*), from 12 Different Geographical Origins
C. Daniere, J. F. Gonnet & A. Moiroud 587

Taxonomic Significance of Major Alkaloids in the Genus *Priestleya*
B.-E. Van Wyk, G. H. Verdoorn, R. Greinwald & P. Bachmann . . 595
Nucleotide Sequences of Genes Encoding a 72,000 Molecular Weight Mosquitocidal Protein and an Associated 20,000 Molecular Weight Protein are Highly Conserved in Subspecies of *Bacillus thuringiensis* from Israel and The Philippines
R. Frutos, Cheng Chang, S. S. Gill & B. A. Federici 599
Book Reviews 611
Notes to Contributors I

number 8

ECOLOGY

The Role of Phenolics in Goldenrod Ball Gall Resistance and Formation
W. G. Abrahamson, K. D. McCrea, A. J. Whitwell & L. A. Vernieri . . 615
Cycad Cone and Angiosperm Floral Volatiles: Inferences for the Evolution of Insect Pollination
O. Pellmyr, W. Tang, I. Groth, G. Bergström & L. B. Thien 623
Effect of some Leaf Essential Oil Phenotypes in Coastal Redwood on the Growth of several Fungi with Endophytic Stages
F. J. Espinosa-García & J. H. Langenheim 629
Effects of Sabinene and γ-Terpinene from Coastal Redwood Leaves Acting Singly or in Mixtures on the Growth of some of their Fungus Endophytes
F. J. Espinosa-García & J. H. Langenheim 643

SYSTEMATICS

Postglacial Dispersal of Longnose Suckers, *Catostomus catostomus*, in the Mackenzie and Yukon Drainages
R. E. Dillinger, Jr, T. P. Birt, J. M. Green & W. S. Davidson 651
Flavonoid Variability Within and Between Natural Populations of *Pinus uncinata*
J. Lauranson & P. Lebreton 659
Flavonoids of the *Muhlenbergia montana* Complex
Y. Herrera A. & J. F. Bain 665
Exudate Flavonoids in Three Persian Asteraceae Species
E. Wollenweber & A. Rustaiyan 673
Flavonoid Variation in *Melampodium*
B. A. Bohm & T. F. Stuessy 677
Chemotaxonomic Significance of Alkaloids in the Genus *Robynsiophyton*
B.-E. Van Wyk & G. H. Verdoorn 681
Alkaloidal Variation in the Genus *Pearsonia*
B.-E. Van Wyk & G. H. Verdoorn 685

NEW SOURCE REPORTS

Flavonoids from some Yugoslavian *Micromeria* Species: Chemotaxonomical Aspects
F. A. Tomás-Barberán, M. I. Gil, P. D. Marin & F. Tomás-Lorente 697
5,7-Dioxygenated Coumarins from the Aerial Parts of *Geleznowia verrucosa* (Rutaceae)
M. A. Rashid, J. A. Armstrong, A. I. Gray & P. G. Waterman 698
Book Reviews 699
Notes to Contributors I